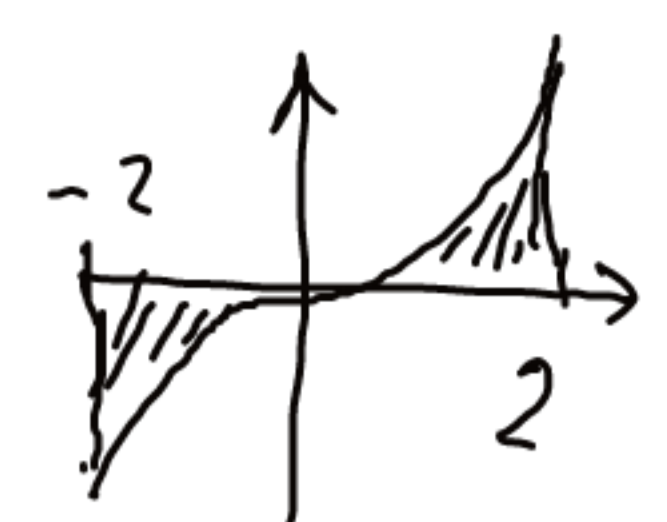
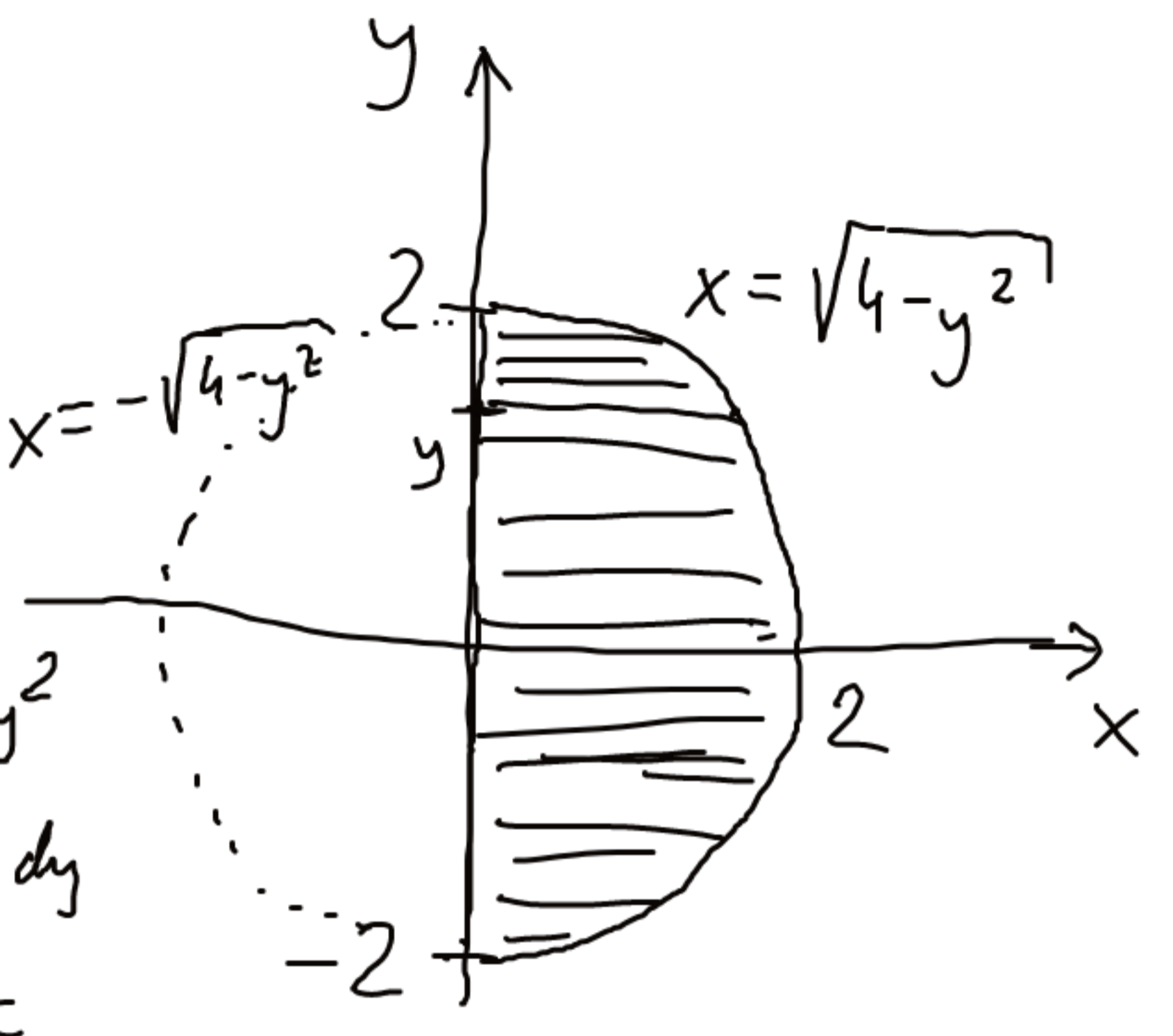


$$\int_{-2}^2 dy \int_0^{\sqrt{4-y^2}} (x^3 + y^3) dx =$$


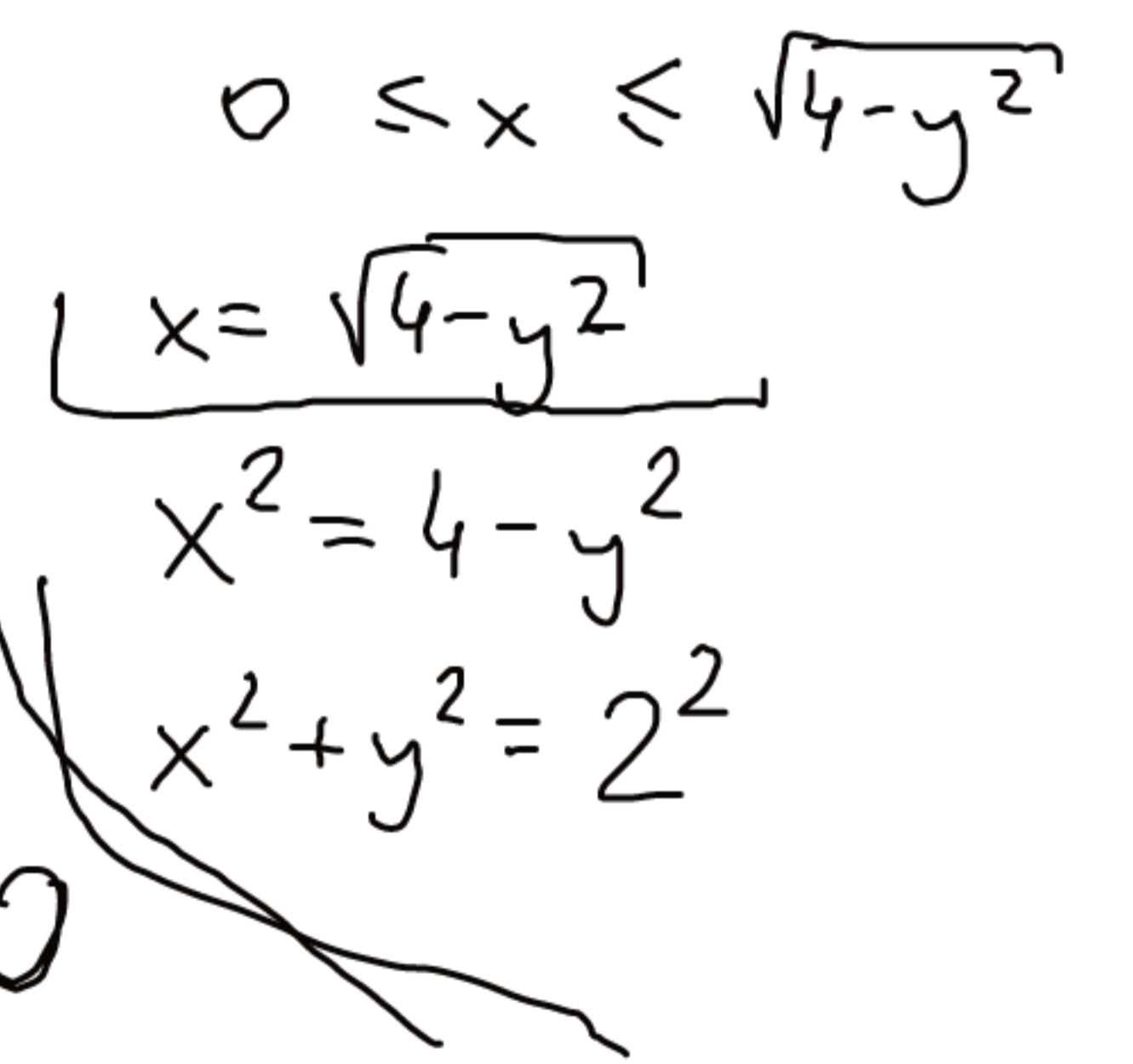
$$= \int_{-2}^2 dy \left(\frac{x^4}{4} + y^3 x \right) \Big|_{x=0}^{x=\sqrt{4-y^2}} =$$

$$= \int_{-2}^2 \left(\frac{(4-y^2)^2}{2} + y^3 \sqrt{4-y^2} - 0 \right) dy = \begin{cases} t = 4 - y^2 \\ dt = -2y dy \\ y^2 = 4 - t \end{cases}$$


$$= \int_{-2}^2 \frac{1}{2} (16 - 8y^2 + y^4) dy + \int_{-2}^2 \sqrt{4-y^2} \cdot \left(\frac{-y^2}{2} \right) (-2y) dy =$$

$$= \frac{1}{2} \left(16y - \frac{8}{3}y^3 + \frac{y^5}{5} \right) \Big|_{-2}^2 + \int_0^4 \sqrt{t} \cdot \frac{-(4-t)}{2} dt$$

$$= \frac{1}{2} \left(32 - \frac{8}{3} \cdot 8 + \frac{32}{5} - \left(-32 - \frac{8}{3}(-2)^3 + \frac{-32}{5} \right) \right) + 0$$



$$\int_0^{\sqrt{4-y^2}} y^3 dx = y^3 \cdot \int_0^{\sqrt{4-y^2}} 1 dx = y^3 \cdot \left(x \Big|_{x=0}^{x=\sqrt{4-y^2}} \right)$$

$$\int 2 dx = 2x$$

$$(y^3 x)'_x = y^3 \cdot 1$$